WHAT IS THE MONTANA DIABETES PROJECT AND HOW CAN WE BE CONTACTED:

The Montana Diabetes Project is funded through a cooperative agreement with the Centers for Disease Control and Prevention, Division of Diabetes Translation (U32CCU815663-01). The mission of the Diabetes Project is to reduce the burden of diabetes and its complications among Montanans. Our web page can be accessed at http://ahec.msu.montana.edu/diabetes/default.htm.

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MONTANA DIABETES SURVEILLANCE & CLINICAL COMMUNICATION

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DIABETES SCREENING PRACTICES AMONG PERSONS ≥45 YEARS OF AGE, MONTANA 1998

WHAT'S INSIDE

BACKGROUND:

In 1997, the American Diabetes Association (ADA) published new diagnostic criteria for diabetes (see page 6).[1] Additionally, the ADA adopted new recommendations for screening the general population ≥45 years of age for diabetes every three years with an emphasis on those at high risk for undiagnosed diabetes.[2] Table 1 displays the risk factors for diabetes. Few studies have examined the extent to which diabetes screening has been adopted. This report describes the results of a special telephone survey of Montanans ≥ 45 years of age to describe the diabetes screening practices among this population. The objectives of this effort were two-fold. The first was to estimate the percentage of Montanans ≥45 who reported screening for diabetes in the past year as well as the past three years. The second was to assess the self-reported risk factors for diabetes among this population and compare the risks to screening practices.

TABLE 1. Major risk factors for diabetes mellitus*

- Family history of diabetes (e.g., parent or sibling with diabetes)
- Obesity (e.g., ≥20% over desired body weight or BMI** ≥27 kg/m^2)
- Race/ethnicity (e.g., African Americans, Hispanic Americans, Native Americans, Asian Americans, Pacific Islanders)
- Age ≥45 years
- Previously identified impaired fasting glucose or impaired glucose tolerance
- Hypertension (≥140/90 mmHg)
- HDL cholesterol ≤35 mg/dl (≤0.90 mmol/l) and/or triglyceride level ≥250 mg/dl (≤2.82 mmol/l)
- History of gestational diabetes mellitus or delivery of a baby over 9 lbs

* adapted from ADA Clinical Practice Recommendations 1999 ** Body Mass Index

METHODS:

In October through December of 1998, the Montana Department of Public Health conducted a random household telephone survey of Montanans ≥45 years of age. The survey was conducted in 18 counties in Montana. The survey items included demographic questions, history of specific chronic diseases, and health care utilization questions. Survey respondents were asked if they ever had been told by a physician they had diabetes, had they been screened for diabetes (past year, 1-3 years ago, >3 years ago/never/not sure), the number of visits to a health care provider (in past year), did they have a family history of diabetes, and had they ever been told they had high cholesterol and/or blood pressure. Respondent's BMI was calculated based on their reported weight and height. Chi square tests for trend were used to assess potential associations between the diabetes screening practices and the risk factors. Logistic regression analyses were conducted to identify factors predicting screening for diabetes in the past year and in the past three years.

CHARACTERISTICS OF SURVEY RESPONDENTS:

A total of 1,204 surveys were completed. Ninety-two respondents (7.6%) reported that they had been told by a physician they had diagnosed diabetes (excluding respondents reporting gestational diabetes only). One thousand one hundred and twelve respondents reported that they did not have diabetes. These respondents are included in the analyses described below. The median age of these respondents was 57 years (range 45-99) and the majority were female (Table 2). Thirty-nine percent of respondents reported a family history of diabetes and 74% reported two or more risk factors for diabetes. Thirty-nine percent of respondents reported screening for diabetes in the past year, 53% reported screening over the past three years and 47% reported screening over three years ago or never.

TABLE 2. Characteristics of respondents without diagnosed diabetes ≥45 years of age, Montana, 1998 (N=1,112).

Characteristics	Median (range)
Age (years)	57 (45-99)
	%
Female	60
Am. Indian	6
Family history of diabetes	39
≥ Two visits to HCP* (past year)	61
BMI ≥27	32
Ever told you have hypertension	28
Ever told you have high cholesterol	28
Number of risks for diabetes	
One	26
Two	34
≥ Three	40
Screening for diabetes	
Past year	39
1-3 years ago	14
>3 years/Never/Not sure	47

*Health care provider

COMPARISON OF SCREENING FOR DIABETES AND ASSOCIATED RISK FACTORS:

Figures 1 through 9 display the comparisons of diabetes screening practices among respondents by the associated risk factors. Respondents who reported recent screening for diabetes were more likely to be ≥65 years of age (Figure 1), have a family history of diabetes (Figure 4), have ≥two visits to a health care provider in the past year (Figure 5), have hypertension (Figure 6), and have high cholesterol levels (Figure 7). We found no association between screening for diabetes by gender, American Indian ancestry, or BMI. Respondents with 3 or more risk factors (this included age ≥45, American Indian ancestry, family history of diabetes, hypertension,

The new criteria define normoglycemia as plasma glucose levels <110 mg/dl in FPG and <140 mg/dl in a 2-hour postload value OGTT. Individuals without diagnosed diabetes who have an FPG ≥110 mg/dl but less than 126 mg/dl are considered to have impaired fasting glucose (IFG). Those with 2 hour OGTT values from ≥140 mg/dl but less than 200 mg/dl are defined as having impaired glucose tolerance (IGT). Both IFG and IGT are risk factors for the development of diabetes. Figure 10 presents an example of a clinical algorithm for diabetes screening and diagnosis.

Plasma glucose testing (or a random plasma glucose measurement) may also be performed on individuals who are not fasting before testing. A random plasma glucose level ≥160 mg/dl (capillary blood ≥140 mg/dl) suggests a need for further follow-up testing — preferably by FPG testing performed on a subsequent day.

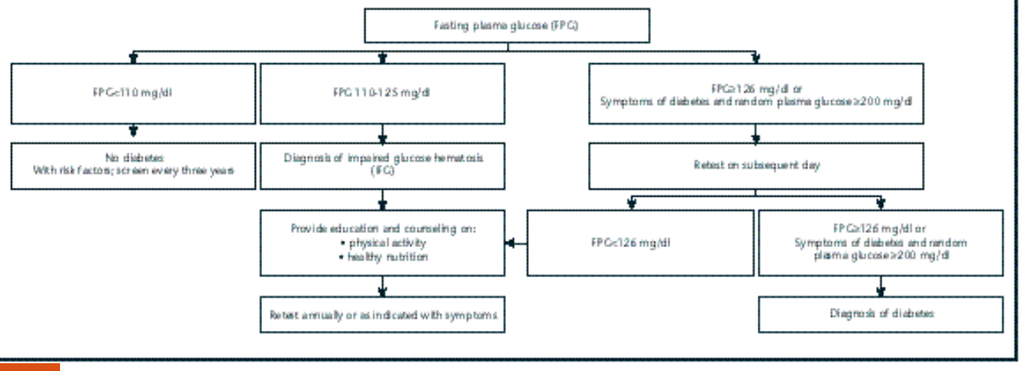
It is critical that the appropriate interpretation of the screening test results is provided to the patient and that follow-up evaluation and treatment are made available.

UPCOMING EVENTS:

Beyond Diabetes Basics: Strategies for Success
September 17-18, 1999, Kalispell:

The Montana Diabetes Project and the Montana American Association of Diabetes Educators are sponsoring a two-day conference for health care professionals. The faculty and topics include: Judy Kohn, RN, BSN, CDE (In-depth diabetes medication management); Margaret Cleary, MS, RN (Working with the visually impaired); and Michelle Deck, RN, BSN, MEd (Improving teaching skills and presentations). For more information call the Diabetes Project at 406/444-6677.

FIGURE 10. Example of a clinical algorithm for diabetes screening and diagnosis using fasting plasma glucose (FPG).*



*Oral glucose tolerence testing can be used to diagnose in unusual cases or when further clarification is needed.

SCREENING GUIDELINES FOR TYPE 2 DIABETES:

Based on recent estimates, approximately 6% of adults in the United States have diagnosed or undiagnosed diabetes. However, specific subgroups have significantly higher prevalence rates of diabetes as compared to the entire U.S. population. High-risk groups have specific risk factors that either directly cause diabetes or are statistically associated with it. The risk of developing type 2 diabetes increases with age, obesity, and the lack of physical activity. The major risk factors for diabetes are displayed in Table 1(see page 1). The risk factors for diabetes are correlated with the potential risk for developing diabetes (e.g., the greater number of risk factors present, the higher likelihood of developing diabetes).

The ADA has published revised clinical practice recommendations regarding type 2 diabetes screening.[1] They recommend that practitioners screen for diabetes as part of routine medical care for patients at high risk.

Both the fasting plasma glucose (FPG) test and the oral glucose tolerance test (OGTT) are appropriate for diabetes screening. However, ADA recommends the FPG test strongly, because it is easier, faster to perform, more convenient and acceptable for patients and less expensive. Fasting is defined as no consumption of food or beverages other than water for at least eight hours prior to testing.

Table 3 displays the criteria for the diagnosis of diabetes mellitus. A FPG level ≥126 mg/dl or a 2-hour postload value from the OGTT ≥200 mg/dl are indicators for re-testing. The later test requires the use of a 75g anhydrous glucose load dissolved in water. Either test must be repeated on a different day to confirm a diagnosis.

TABLE 3. Criteria for the diagnosis of diabetes*

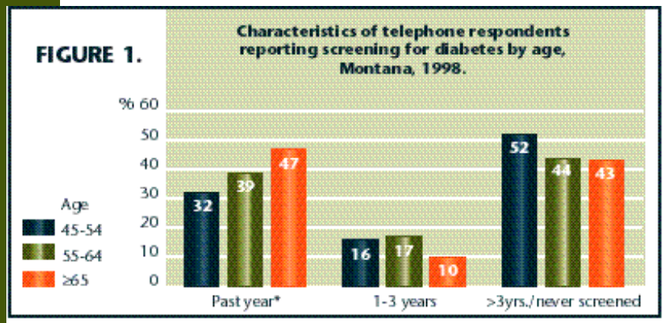
	Normoglycemia	Impaired Fasting Glucose (IFG) or Impaired Glucose Tolerance (IGT)	Diabetes mellitus**
Fasting Plasma Glucose (FPG)	<110 mg/dl (<6.1 mmol/l)	IFG≥110 and <126 mg/dl (6.1-7.0 mmol/l)	≥126 mg/dl
2 hour Oral Glucose Tolerance Test (OGTT+)	<140 mg/dl (<7.8 mmol/l)	IGT≥140 and <200 mg/dl (7.8-11.1 mmol/l)	≥200 mg/dl
Other	—	—	Symptoms of diabetes and a random plasma glucose≥200 mg/dl

* Adapted from ADA, 1999

** A diagnosis of diabetes must be confirmed by FPG, 2 hour OGTT or random plasma glucose (if symptoms are present).

+ This test requires the use of a 75g anhydrous glucose load dissolved in water.

FIGURE 1. Characteristics of telephone respondents reporting screening for diabetes by age, Montana, 1998.



*p<0.001, Chi-square test for trend

FIGURE 2. Characteristics of telephone respondents reporting screening for diabetes by sex, Montana, 1998.

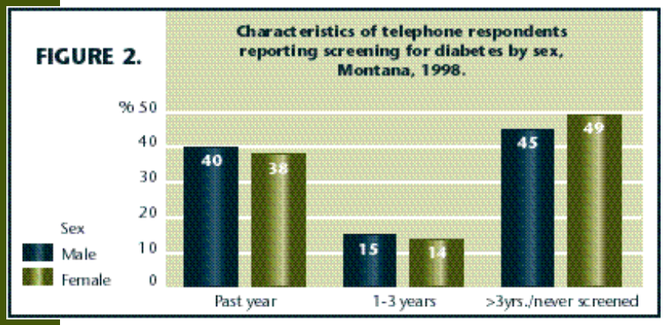


FIGURE 3. Characteristics of telephone respondents reporting screening for diabetes by American Indian ancestry Montana, 1998.

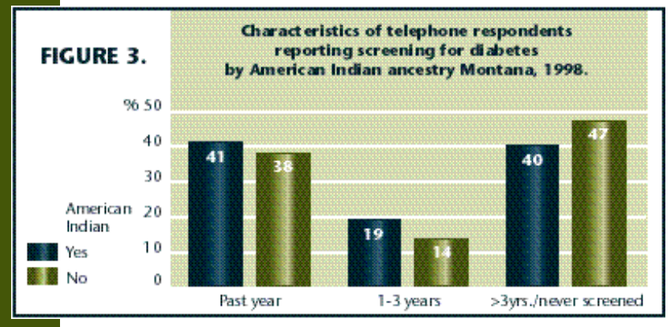
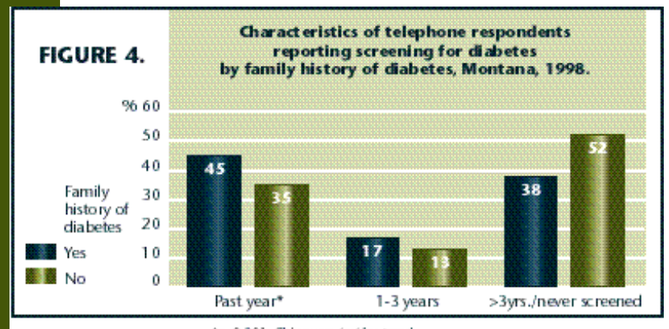
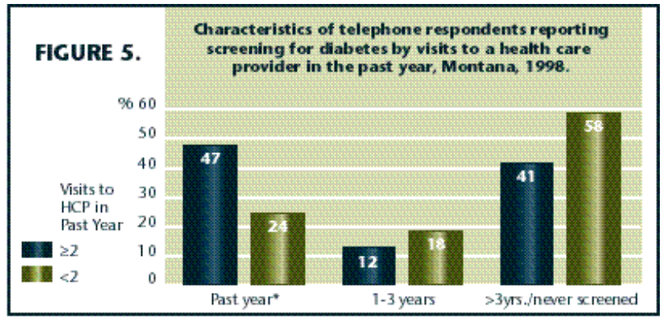


FIGURE 4. Characteristics of telephone respondents reporting screening for diabetes by family history of diabetes, Montana, 1998.



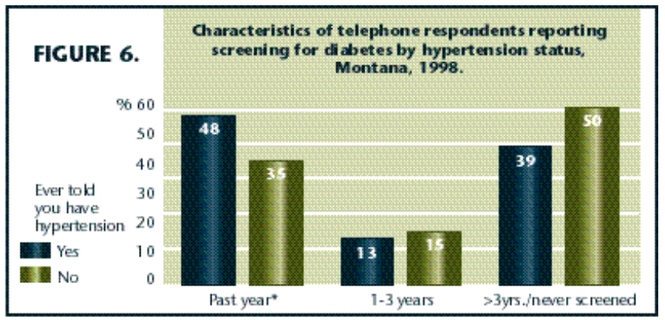
*p<0.001, Chi-square test for trend

FIGURE 5. Characteristics of telephone respondents reporting screening for diabetes by visits to a health care provider in the past year, Montana, 1998.



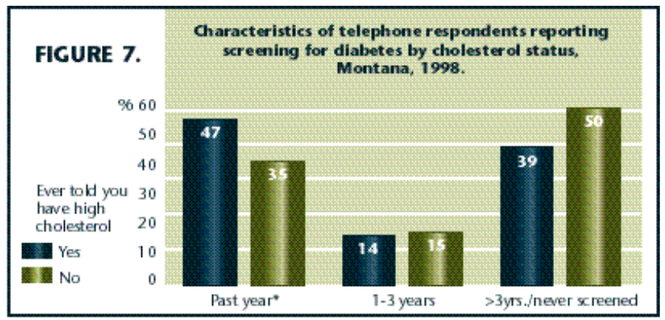
*p<0.001, Chi-square test for trend

FIGURE 6. Characteristics of telephone respondents reporting screening for diabetes by hypertension status, Montana, 1998.



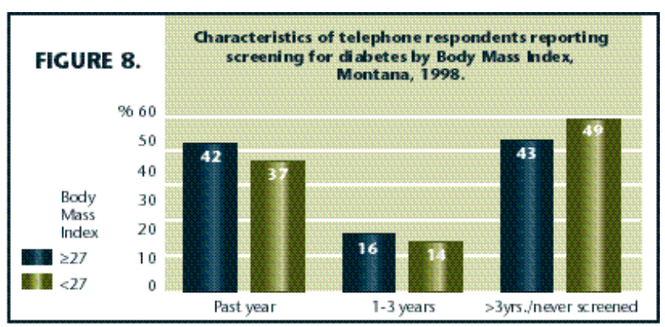
*p<0.001, Chi-square test for trend

FIGURE 7. Characteristics of telephone respondents reporting screening for diabetes by cholesterol status, Montana, 1998.



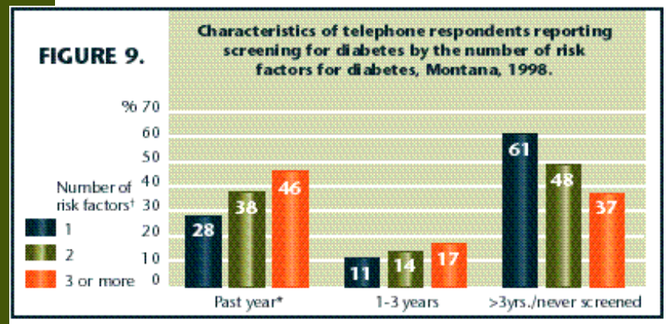
*p<0.001, Chi-square test for trend

FIGURE 8. Characteristics of telephone respondents reporting screening for diabetes by Body Mass Index, Montana, 1998.



high cholesterol, or BMI ≥27), were more likely to be screened for diabetes as compared to respondents with one risk factor (Figure 9).

FIGURE 9. Characteristics of telephone respondents reporting screening for diabetes by the number of risk factors for diabetes, Montana, 1998.



†Risk factors include: Age≥45, American Indian ancestry, family Hx. of diabetes, high cholesterol, hypertension, BMI≥27

*p<0.001, Chi-square test for trend

PREDICTORS OF SCREENING FOR DIABETES:

Logistic regression analyses were used to identify risk factors that predicted screening for diabetes in the past year and in the past three years. Three factors predicted screening for diabetes in the past year: ≥2 visits to a health care provider in the past year (OR 2.34; 95%CI 1.76-3.11); high cholesterol status (OR 1.37; 95%CI 1.03-1.82); and family history of diabetes (OR 1.45; 95%CI 1.12-1.89). Similarly, these three factors also predicted screening for diabetes in the past three years: ≥2 visits to a health care provider in the past year (OR 1.70; 95%CI 1.30-2.21); high cholesterol status (OR 1.34; 95%CI 1.01-1.78); and family history of diabetes (OR 1.72; 95%CI 1.34-2.23).

LIMITATIONS:

There are a number of limitations to the data presented above. First, these data were collected via telephone survey and are self-reported, raising concerns about data validity. Second, because the survey was conducted by telephone, the screening practices of Montanans who live in homes without telephones are not reflected in the results.

CONCLUSIONS:

These data suggest that diabetes screening is being adopted among persons ≥45 years of age, particularly among persons with more health care visits, high cholesterol, and family histories of diabetes. Excluding age, 74% of respondents reported one or more risk factors for diabetes. Over 35% of respondents who were overweight/obese and hypertensive had not been screened for diabetes within the past 3 years or had never been screened. Strategies are needed to increase screening among those at high risk for diabetes.

References:

1. American Diabetes Association. Report of the expert committee on the diagnosis and classification if diabetes mellitus. Diabetes Care 1999;22(Sup. 1):S5-S19.
2. American Diabetes Association. Screening for type 2 diabetes. Diabetes Care 1999;22(Sup. 1):S20-S23.

Web site address for these references: (http://www.diabetes.org/DiabetesCare/Supplement199/default.asp)

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